AUSTRALIAN SOCIETY FOR LIMNOLOGY

LIMNOLOGY NEWSLETTER

Volume 22. Number 1. March 1984

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SUBMISSION TO THE INTERIM COUNCIL OF AN AUSTRALIAN INSTITUTE FOR FRESHWATER STUDIES

by

AUSTRALIAN SOCIETY FOR LIMNOLOGY

Preamble

The Australian Society for Limnology is an association of over 425 people with professional or amateur interests related to Australian inland waters. Limnology is the science of inland waters, which may include lakes, reservoirs, billabongs, ponds, rivers and creeks. Limnologists attempt to explain the biota of inland waters by providing an understanding of their relationships to one another and to their environment. As a result, limnologists include those with specialisation in zoology, botany, microbiology, chemistry, hydrology, hydrodynamics and physics.

Since its inception in 1961, the Australian Society for Limnology has vigorously promoted the role of limnological research and education in Australia by the organization of conferences and by the publication of a Newsletter, a Bulletin and a series of Special Publications. The Society also has a strong interest in the management and conservation of aquatic resources.

Introduction

Although Australia is the driest inhabited continent, we know surprisingly little about its aquatic resources. Whilst considerable emphasis has been placed on water resource availability and the best means of managing and utilizing water resources from a supply perspective, we are relatively ignorant about many other fundamental properties of our aquatic resources.

As Australian water resources progresses from a largely development phase (e.g. building of dams and irrigation networks) to one of better management of the existing water resources, there will be an increasing need for more detailed limnological information, the majority of which must come from research in Australia of Australian aquatic systems and not from the uncritical adoption of overseas information.

In this submission the Australian Society for Limnology submits that:

(a) There is insufficient limnological knowledge of Australia's inland water resources at the level of fundamental or basic research and at the applied level. In particular, there is a very poor understanding of the dynamic processes operating in aquatic ecosystems and the interactions between the biological, chemical and physical components.

(b) If coherent, useful research is to be conducted at both the basic and the applied levels, the funding of long-term projects, in the order of ten years duration, is essential.

(c) Water research in Australia receives insufficient funds, is fragmented and poorly coordinated. There is an urgent need for increased funding and for the development of well defined national priorities. A National Water Research Council should be established to coordinate research and dispense funds within a series of national priorities..

(d) Short-term water research would be best organised via a project grant scheme along the lines of the previous AWRC scheme, but with greater attention given to the criteria used to select the projects.

(e) Long-term water research should be carried out by an Australian Institute for Freshwater Studies. Such an Institute would be best organised as a small central institute, with a series of regional research centres attached to it, or as a well coordinated consortium of water research centres, each designated to conduct multidisciplinary research into a specific area of freshwater science.

(f) In view of the changing emphasis in Australian water resources from development to management, there will be an increasing need for more and better trained limnologists in the future. Funds should be made available for post graduate scholarships in limnology, for the development of new courses in limnology, and for post doctoral fellowships in limnological sciences.

Limnological knowledge

Many aspects of limnological work are hampered by a lack of basic information. In ecological studies, the inadequate taxonomic status of much of the freshwater biota limits the usefulness of the studies. In pollution studies, the lack of toxicity data relevant to Australian freshwater organisms is a major deficiency. Overseas data are in no way an adequate substitute. Likewise, our limited understanding of the relationships and interactions between light, nutrients, turbidity and plant growth retards eutrophication research. Assessment and prediction of the environmental impacts of developments in and around inland waters is hampered by the absence of adequate studies of unaltered aquatic ecosystems.

Lack of basic research is currently inhibiting the development of applied aspects of limnology within Australia. There needs to be recognition of the fact that the usefulness of applied limnology is directly related to the adequacy of the fundamental knowledge upon which it is based.

Many current investigations concentrate on monitoring aquatic ecosystems. This is understandable, particularly so in programs mounted by government instrumentalities. Yet exhaustive monitoring rarely leads to enlightenment. In the long term, it will be better to utilize resources in such a way that our understanding of the functioning of aquatic systems is enhanced. In this way real solutions to problems are likely to be forthcoming. An added advantage of understanding systems is that more realistic and cost effective monitoring programs will result.

In addition to the applied limnological aspects, there is a need to recognize the fact that inland waters are important systems for fundamental ecological research. Australia contains some limnologically unique habitats and numerous endemic aquatic species. Many Australian aquatic organisms are of great international scientific importance for biogeographical reasons. Many more are apparently little changed from ancestral forms and may help to elucidate evolutionary patterns. Yet in many cases we know almost nothing about the species, their habitat requirements or appropriate management strategies for their conservation.

Long-term funding

The usefulness of baseline data and fundamental limnological research are related to the length of time over which studies are conducted. For example, there have been no long-term studies on the invertebrate fauna of Australian rivers. Hence it is almost impossible to distinguish between natural fluctuations in faunal composition and changes which may be due to mild stress, for example from organic pollution.

The Australian environment and climatic regime are also highly variable and it should not be expected that short-term projects of two to three years will provide adequate answers.

Long-term funding is also an important consideration when examining the efficiency of resource usage in water research, in particular, the use of highly trained human resources (research students and scientists). Over recent years there a disturbing trend towards the funding of mainly short-term, very specific projects. Such an approach certainly enables the students and research scientists to gain expertise and skills in a particular area of aquatic research. However, unless further research funds are forthcoming, this human resource is wasted as the people concerned move to other areas of the workforce which provide greater job security.

Insuffient and fragmented research effort

Water research in Australia is extremely poorly funded compared with most other developed countries (AWRC 1982). Government funding allocates very much more to marine research than to limnological research. This is reflected in a recent analysis by Ottaway & Hart (1983) of papers published in the Australian Journal of Marine and Freshwater Research where it was shown that for every 35 papers published on limnological research there were 55 on marine research and that the majority of the limnological research was conducted in tertiary institutions.

Limnological research in Australia is largely conducted by individuals and small groups scattered throughout the country, a situation which is not conducive to a cohesive research effort.

The recent Australian Water Resources Council review "Water Research in Australia: Directions for the Future" (AWRC 1982) summarised the situation well when it commented "Australia's current water research effort in inadequate, fragmented and poorly balanced, and has substantial gaps."

It is clear that limnological research would greatly benefit from increased levels of funding, but that any increased funding must be dispersed according to a set of national priorities.

The AWRC Review made specific recommendations for an increased funding for water research (up to $30 million per annum by 1984/85) and for the establishment of a National Water Research Council to set priorities for, and coordinate, water research in Australia. The Australian Society for Limnology endorses these recommendations and strongly suggests the Interim Council adopts them.

Organisation of freshwater research in Australia

In considering the organisation of freshwater research in Australia, ASL strongly suggests the Interim Council takes into consideration:

(i) That funding be restricted to research projects, as opposed to monitoring programs. Routine monitoring programs should be conducted and funded by appropriate State government authorities. Where a new development such as a storage reservoir is proposed, monitoring for baseline data and any changes associated with the development should be funded by the developing authority. For example, in Victoria, the Melbourne and Metropolitan Board of Works has funded an investigation into the impact of the Thompson Dam project on benthic invertebrates in the river.

(ii) that there is a special case for establishing and funding multidisciplinary limnological research in Australia. The uniqueness of our biota, climate and land forms, means that biological, chemical and hydrological knowledge gained overseas is not directly applicable to Australia. This is particularly so for biological information, which is unfortunately the area that has been most neglected in past Australian water research. This is the area of limnological research that needs most emphasis in the immediate future.

To facilitate the limnological research needed to supplement our existing meagre knowledge, ASL proposes the following structure:

(i) The establishment of a National Water Research Council to coordinate research and dispense funds within a series of national priorities.

(ii) The continuation of a system of project grants for short-term research on particular, well defined basis and applied projects. However, consideration should be given to devising a considerably better system to assess the scientific worth of the projects than existed with the previous AWRC research grants system.

(iii) The establishment of an Australian Institute for Freshwater Studies to conduct in particular the long-term, multidisciplinary limnological research needed.

There appear to be three models for such an Institute:

1. a single large national institute (e.g. like the Australian Institute for Marine Sciences (AIMS) which is situated in Townsville;
2. a central institute with a series of regional research centres attached to it;
3. a well coordinated consortium of limnological research centres each designated to conduct multidisciplinary research into a specific area of freshwater science.

The strongly expressed view of most ASL members is that a single national water research institute is not desirable in Australia. It would be wasteful of existing resources, would be unlikely to achieve the aims of increasing limnological knowledge in a country with a wide range of extremely different aquatic habitats and would be very likely to become isolated from the information users. This was also the conclusion arrived at by the recent AWRC (1982) review which recommended that "The development of a single research centre would be inappropriate at present".

ASL favours either of the options 2 or 3. Some more detailed information on these two options is given in Appendix A.

Whichever option is adopted, it is essential that the staff at each institute was well balanced so that long-term, truely multidisciplinary studies could be undertaken.

In a number of cases, the new institutes could be based on existing smaller research groups, with the obvious benefits of utilising the existing research infrastructure including buildings, equipment, staff and expertise.

Need for programs to train and employ more limnologists

Previously we have argued that Australia is changing from a water resources development phase to one in which management of these resources will be most dominant. As a consequence, there will be an increasing need for more detailed knowledge of the aquatic systems to be managed and for more trained limnologist (amongst others) to obtain this knowledge.

There are very few limnologists presently employed by State water authorities, particularly when compared with the number of engineers and chemists. ASL forsees serious consequences for the efficient management of our water resources if this imbalance is not adequately addressed in the very near future.

This need could be highlighted if the Interim Council:

(i) recommended additional funding in selected Australian tertiary institutions specifically for post graduate limnological training. This funding could involve additional post graduate scholarships, specifically for limnological studies, the establishment of specific limnological higher degrees by research or course work (or a combination of both), and the establishment of a series of post doctoral fellowships in limnological sciences.

(ii) identified an increased need for limnologists in State water studies.

APPENDIX A: Establishment of an Australian Institute for Freshwater Studies

The Australian Society for Limnology strongly supports the moves to establish an Australian Institute for Freshwater Studies. In the submission several models were advanced and we argued against the establishment of a single national water research centre in favour of either (i) a central institute, with a series of regional research centres attached to it, or (ii) a well coordinated consortium of water research centres, each designated to conduct multidisciplinary research into a specific area of freshwater science. We believe that either of these systems would ensure that areas of "real" significance would be researched in close collaboration with the user organisations.

There are a number of possible ways in which the various Centres could be structured. These include:

(a) Habitat type: examples are

- Lakes and reservoirs
- Rivers and streams
- Wetlands
- Aquatic systems in tropical regions
- Aquatic systems in arid regions

(b) Geographical area:

- Murray-Darling region - to concentrate on this most important river system which is much in need of a well coordinated, long-term research program, but also to study south-east Australian running water (lotic) systems.
- Northern Territory (or northern Queensland) - to study tropical freshwater ecosystems.
- Tasmania - to study temperate standing water (lentic) ecosystems.
- Western Australia - to study lentic and lotic ecosystems in Mediterranean and arid environments.
- South Australia - to study aquatic ecosystems in arid environments.

(c) Designated multidisciplinary areas of freshwater science: the following were recommended by the AWRC Review as potential centres of research concentration.

- aquatic ecology - this could be positioned on the River Murray system.
- water quality criteria
- tropical limnology
- eutrophication
- catchment hydrology
- reservoir dynamics

Because a number of institutions are already actively engaged in limnological research and thus have the necessary equipment, library facilities and experienced personnel, it would appear that the most effective way of establishing research centres would be to set them up in association with existing institutions, be they tertiary institutions or government bodies such as CSIRO. Although such centres could be attached to pre-existing institutions they would retain autonomy and independent funding.

The role of the Institute should be:

1. to undertake long-term research within the national priorities designated by the NWRC;
2. to undertake limited short-term project research, with consulting fee covering all costs, rather than the centre effectively subsidising consulting work as often happens at tertiary institutions;
3. provide an effective technology transfer service nationally, in which the results of research are made available in an understandable and usable manner;
4. in the case particularly where Centres are associated with tertiary institutions, to provide educational opportunities that may include postgraduate training programs, limnology study groups, short courses, conferences and workshops.

LIMNOLOGY BIBLIOGRAPHY

The following is a list of titles or reprints received for the limnology bibliography for Australia or by Australian workers. For inclusion of references, please forward titles, abstracts, reprints or citations to R. TAIT, c/- ESSO AUSTRALIA LTD, COAL & SYNTHETIC FUELS DEPARTMENT, G.P.O. Box 4047, SYDNEY, 2001, N.S.W. To make this complete and worthwhile, everybody in ASL should contribute.

1982:

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Cadwallader, P.L. and Eden, A.K. Observations on the food of rainbow trout, Salmo gairdneri Richardson, in Lake Purrumbete, Victoria. Aust. Soc. for Limnology, Bulletin 8: 17-21.

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Coles, R.G. and Greenwood, J.G. Seasonal movement and size distribution of three commercially important Australian prawn species (Crustacea : Penaeidae) within an estuarine system. Aust. J. Mar. & Freshwater Res., 34 (5): 727-743.

Fulton, W. Macrobenthic fauna of Great Lake, Arthurs Lake and Lake Sorell, Tasmania. Aust. J. Mar. & Freshwater Res., 34 (5): 775-785

Fulton, W. Qualitative and quantitative variation in the macrobenthic fauna of the original lake and new lake areas of Great Lake and Arthurs Lake, Tasmania. Aust. J. Mar. & Freshwater Res., 34 (5): 787-803.

Ganf, G.G. An ecological relationship between Aphanizomenon and Daphnia pulex. Aust. J. Mar. & Freshwater Res., 34 (5): 755-773.

Russell, D.J. and Garrett, R.N. Use by juvenile barramundi, Lates calcarifer (Bloch), and other fishes of temporary supralittoral habitats in a tropical estuary in northern Australia. Aust. J. Mar. & Freshwater Res., 34 (5): 805-811.

Book Reviews

Forsyth D.J. and Howard-Williams C. (co-ordinators) (1983) Lake Taupo: Ecology of a New Zealand lake. Science Information Publishing Centre, D.S.I.R., Wellington, [D.S.I.R. Information Series No. 158], 163 pp. N.Z. $21.00.

reviewed by I.A.E. Bayly

With an area of 616 km^2 and a volume of 59 km^3, Lake Taupo is, by both criteria, the largest lake in New Zealand, and larger than any permanent lake in Australia. A scientific book about Lake Taupo should therefore be of some consequence to limnologists in our part of the world.

This is not a highly technical book, but a "popular" or "chatty", general account of the lake including geological, historical (Maori and European settlement), climatic, hydrological, hydro-electrical and limnological aspects. For the biologist there are chapters on plants of the littoral zone, plankton of the open water, animals of the lake bed, native fish, trout, and "aquatic birds". The biological limnology is essentially at the level of basic natural history with little of interest for the tertiary educational level. It does, however, contain material suitable for incorporation into the aquatic ecology portion of a biological course at the secondary level, especially in the New Zealand context.

The statement in the introduction that "The Federation [of Lake Taupo Angling, Shooting and Boating Clubs] ..... has continued to act vigorously ..... against the introduction of exotic species that could harm the world-famous trout fishery " leaves one wondering whether trout have not somehow acquired honorary native status!

The repeated use (pp. 2 and 101) of "aquatic earthworms" instead of "aquatic oligochaetes" is jarring. A time-honoured, albeit somewhat imprecise, ecological division of the Class Oligochaeta is terrestrial oligochaetes or "earthworms" as opposed to aquatic oligochaetes. Why confuse this tolerably useful traditional distinction?

The general presentation is attractive; not only is there a good number of well designed line figures and half-tone plates, but there is a liberal number of colour photographs.

J.A. Thornton (editor):
Lake McIlwaine; the eutrophication and recovery of a tropical African man-made lake. Monographiae Biologicae 49. Dr. W. Junk b.v. Publishers, The Hague, The Netherlands. 1982. 251 pages. Price: US$ 49.50.

Reviewed by T. Petr.

In the early 1960s, McIlwaine Reservoir, constructed in 1952-3, entered a mesotrophic phase, which subsequently changed to eutrophy and hypertrophy. As a result of implementation of a nutrient diversion programme in the early 1970s, the lake has recovered to mesotrophy.

This is the major theme of the book, which discusses various aspects which have accompanied the process of eutrophication and recovery. There are seven sections in this book: 1. Introduction; 2. Geology and geography; 3. Physics; 4. Chemistry; 5. Biology; 6. Utilization, management and conservation; 7. Bibliography. It has 22 contributors and 28 chapters. McIlwaine Reservoir, situated about 30 km from Harare, the capital of Zimbabwe in Africa, has been exposed to the stresses which accompany a high population density environment. A multiple-use reservoir, the main purpose of which is to supply water to the city, with other functions such as irrigation, recreation, and fisheries, it has also become the receptacle of Harare's sewage effluents.

The physico-chemical character of McIlwaine is close to a number of Australian lakes and reservoirs, with sodium and chlorides dominating the ions, and with the range of conductivity 65 - 232 microsiemens cm^{-1}. After establishing the data-inventory of this lake, research was dircted predominantly towards monitoring the undergoing changes. By 1968 nitrogen and phosphorus concentrations had increased by a factor of between 5 to 10 times their original levels, and nitrogen became the primary growth-limiting nutrient. The diversity of phytoplankton was reduced, with blue-green algae highly dominant. The fish fauna had also undergone changes, with the phytoplanktivorous Tilapia rendalli and Sarotherodon macrochir dominant in 1972. The successful application of 2,4-D to control Eichhornia crassipes altered the dominant macrophyte population.

Since the implementation of a nutrient diversion programme in 1970, a gradual change has been noticed in a number of parameters, such as a reduction in the intensity of the algal blooms, a gradual increase in macrophytes (with the exception of the closely monitored and controlled E. crassipes), and increase in numbers of Labeo altivelis, a feeder on periphyton growing on aquatic macrophytes. By 1979, this fish dominated the fish landings with 60% of the total.

One of the lessons learned from this book is that decreases in total load of phosphorus can be successfully achieved through the control of point sources and the diversions of municipal waste water to irrigation schemes. Amongst the best chapters of this book are the one on sediments (Thornton and Nduku), and that on water supply and sewage treatment in relation to water quality (McKendrick). The latter shows the engineering capability to maintain good water quality in spite of various stresses. The information on insecticide accumulation (Greichus) is a welcome addition to our knowledge, although the fact that the total concentration of DDT in at least two fish species has increased substantially between 1974 and 1979 must be considered a disturbing trend. I found the chapter on phytoplankton nutrient limitation (Watts) too detailed and speculative, and difficult to follow, perhaps because of its length. The chapter on successful control of water hyacinth (Jarvis, Mitchell and Thornton) shows not only the high efficiency of 2,4-D, but also the response of other macrophytes to the removal of this plant. Success and failure of introduced fish is shown by the establishment of two tilapias of significance to fisheries, and by the failure of common carp and black bass to spread in this reservoir (Marshall). The suggestion that Sarotherodon macrochir is doing very well because it may be able to digest blue-greens requires further testing.

There is some duplication of information in this book, a few typographical errors, and some references are omitted. Data by various contributors on lake volume, river basin area and mean annual run-off do not match (cf. pages 6, 11, 26, 37), and some common names of fish on pages 98 and 185 also do not match. Table 9 on page 220 contains some obsolete data on fish catches. For example, the 40 kg ha^{-1} yr^{-1} given for fish catches for Lake Kinneret (Lake Tiberias in the book) is quite out of date, as it was 102 kg for the period 1974-6, and 112 kg for 1977-80. The mean catch for Lake

Victoria for the period 1970-9 was 14 kg ha^{-1} yr^{-1} (the book gives 2 kg). One could also disagree with the statement by Cochrane that the fish in Zimbabwe are grossly under-utilized, given a fish catch for Lake McIlwaine of 120 kg/ha^{-1} yr^{-1}.

This book is a welcome contribution to our still sparse knowledge of medium-sized tropical and subtropical multipurpose reservoirs under various stresses. No doubt, much of it is relevant as a reference point for Australian conditions where eutrophication of reservoirs is a major problem and suggestions on successful ameliorative processes are welcome. The book, by indicating means of handling the eutrophication problem through close collaboration of biologists and engineers, shows the way to successful multidisciplinary action.

New Members

The Society welcomes the following new members :

Lynette Allen, Queensland.
Carol Allen, James Cook University.
Anne Adams, ACT.
Janis Backhouse, University of New England.
Michelle Barson, AWRC.
Lee Bowling, University of Tasmania.
Mark Brymner, Albury-Wodonga Corporation.
Andrea Fleming, Camberwell.
Greg Raisin, Chisholm Institute of Technology.
Julia Reed, Chisholm Institute of Technology.
Maxine Rowley, CSIRO Centre for Irrigation Research.
David Tiller, Canberra CAE.

News

JIM WHARTON RETIRES

After almost 43 years of association with fisheries in Victoria Jim Wharton has retired. Jim is moving to NSW where he is building a house near Brunswick Heads. His new postal address is c/- P.O. Mullumbimby, NSW and members of the society can find him in a caravan on Lot 17, Tandy's Lane, Everetts Hill, which is a ridge 4km south of Brunswick Heads. Jim is not retiring from the society, however, and hopes to have more time in future to attend meetings. The society wishes him well in his retirement.

JOLLY AWARD 1982/3.

The Jolly Award Committee has considered the nominations for 1982/3 and has decided not to make an award.

INSTITUTE OF BIOLOGY IN AUSTRALIA

The London based Institute of Biology has recently established an Australian branch which will be known as the Institute of Biology in Australia. The Institute already has nearly 200 Australian members. Members receive the journal "Biologist" and a discount on the "Studies in Biology" series as well as discounts on "The Journal of Biological Education" and "The Journal of Biosocial Sciences". Information regarding membership may be obtained from the Membership Officer, Institute of Biology in Australia, Science Centre, 35-43 Clarence Street, Sydney 2000.

NEW PUBLICATION

John Harris of the School of Zoology at the University of NSW, has produced a revised version of his publication "Structures affecting fish migration in streams draining the south-eastern coastal region of Australia". John is interested in hearing from anyone who may have any additions or comments for future editions.

LIMNOLOGY BIBLIOGRAPHY

Russ Tait is anxious to receive titles or reprints of papers and reports published on Australian limnology or by Australian workers. The bibliography is published in the Newsletter and to maintain it at high quality Russ needs your support. You will find his address above the bibliography elsewhere in the newsletter.

Minutes

MINUTES OF THE EXECUTIVE MEETING OF THE AUSTRALIAN SOCIETY FOR LIMNOLOGY HELD AT GRIFFITH UNIVERSITY BRISBANE ON 22 MAY 1983

Meeting commenced at 6.50 p.m.

Present: B. Hart, M. Hart, R. St. Clair, J. Benzie, R. Tait, R. Shiel, J. Chambers, P. Suter, K. Bishop, S. Morison and D. Mitchell.

General Business:

I. Campbell was appointed Editor for 1983-84. P.S. Lake was appointed to the Editorial Committee. Two other committee members will be appointed later.

It was decided that the 23rd Congress be held at Mt. Gambier in 1984. The theme is to be management of water supply catchments which would bring in ground water, the River Murray and urban catchments.

Due to the number of executive members not in Victoria or South Australia a greater exchange of information will be necessary, particularly with members unable to attend meetings.

D. Mitchell suggested that a workshop on research priorities would be very useful at this stage, with B. Hart, J. Kirk and D. Mitchell to suggest format. AWRC funding for the workshop should be sought.

M. Hart reported that she thought it would be possible for ASL memebers to subscribe to other CSIRO publications such as Aust. J. Botany and Aust. J. Zool. If this is so the rates to members will be listed in the next newsletter.

Meeting closed at 7.00 p.m.

MINUTES OF THE EXECUTIVE MEETING OF THE AUSTRALIAN SOCIETY FOR LIMNOLOGY HELD AT CHISHOLM INSTITUTE OF TECHNOLOGY ON 29.7.1983

The meeting commenced at 4.15 p.m.

Present were B. Hart, J. Kirk, M. Hart, A. Morison, R. St. Clair, and I. Campbell.

Apologies were received from P. Suter, D. Mitchell, R. Shiel, J. Chambers, K. Bishop and R. Tait.

Previous minutes: minutes of the meetings held on 3.3.83 and 22.5.83 were confirmed.

I. Matters arising from the minutes:

1. ASL library. Secretary to write to G.Ganf requesting confirmation of acceptance of ASL library by the Barrsmith Library at University of Adelaide.

2. Australian Academy of Sciences. Secretary to write to Prof. Williams re the position of the National Committee of Water Science.

3. M. Hart reported that it will be possible for members to subscribe to AJMFR ($25), Aust. J. Zool. ($30) and Aust. J. Bot. ($30) for 1984.
Details to be provided in the next newsletter.

4. Brisbane Congress. M. Hart reported that the finances were still be finalised but it appeared the Congress broke even.

5. Editorial Committee. Ian Campbell to consider whom to recommend for the Editorial Committee.

6. ASL Workshop. B. Hart reported that he was having difficulty getting funding for a workshop on research priorities organised by ASL. He suggested the best time for such a workshop was 26 November 1983, immediately following an AWRC symposium. B. Hart and J. Kirk to follow up. It was suggested that notes be given to participate prior to that date.

II. Business:

1.Correspondence - inward

Aust. Acad. Sci. re Boden Congress

Aust. Acad. Sci., minutes of meeting of National Committee on Animal and Veterinary Sciences.

Aust. Acad. Sci., notice of meeting of National Committee on Antartic Research; details sent to I.A.E. Bayly

P.S. Lake, re Jolly Award and Boden Congress

M. Brock & S. Bunn (Inland Aquatic Res. Group, W.A.) inviting ASL to Perth for 1985 and suggesting August instead of May

N.S.W. National Parks Service, re planning management of Yuraygir National Park

ANZAAS, giving notice of 1984 Congress to be held in Canberra on 14-18 May

C. Mason, press release

D. Chipp, press releases

R. White, re sending newsletter

W.Williams, re sending order forms for his new book in ASL Newletter

J. Wharton, re State Conservation Strategy

Governor General's Dept. requesting information

Aust. Con. Foundation, sending a copy of N.S.W. State water plan

Nat. Heritage Commission, listing the Upper Acheron, Aberfeldy and rivers on the national estate.

Correspondence - outward

R. White, re sending newsletter and publications to new editor
Dr. Wild, re CSIRO spending on AJMFR
D. Pollard, requesting information for Governor General's Dept.
J. Kirk,informing him of his election as Vice President of ASL
J. Benzie, re student prize

2.Matters arising from correspondence

a) Sam Lake suggested that ASL not apply for a Boden Congree for 1984;instead the attention of members should be drawn to the 1984 Australian Ecological Society's Conference entitled "Are Australian Ecosystems Different?"

b) W.D. Williams' new book "Life in Inland Waters". It was agreed that order forms could be included in the newsletter if Blackwells pay ASL $150 and give ten per cent discount to members. M. Hart to arrange this with Blackwells.

c) NSW State Water Plan. B. Hart and R. St. Clair to carry out any action required by ASL.

3. Publications

I. Campbell reported that it would be quicker, cheaper and easier to produce the newsletter by photoreproduction of a wordprocessed copy than if it was typeset. It was decided that this was adequate for the newletter and so it will not be typeset.

Typesetting of bulletins and special publications would be considered when material to be published arrives from R. White.

Newsletters for 1983 should be sent in mid-August, early October and early December.

Publications in preparation - Bulletin No. 10 and special publication by L. Llewellyn; I. Campbell to write to R. White requesting again that this material be sent over.

4. Mt Gambier Congress

P. Suter said the conference could be held either 11-13 or 18-20 of May 1984; it was decided 18-20 May was best.

5. Constitution and Standing Rules

Following constitutional changes at the last AGM it was decided to update the Constitution. Before doing so it will be checked for anomalies and any other necessary changes. Policy matters made by the Society at various stages will be collected together as a set of standing rules. Any areas not adequately covered by the Constitution or standing rules will be considered. R. St. Clair and B. Hart to follow up.

6. Perth Congress

It was decided to accept the recommendation of W.A. Inland Aquatic Research Group to hold the 1985 Congress in August instead of May. It was decided to start planning this congress now as it may be possible to either arrange bulk fares for members or sponsorship by the W.A. Government or industries. R. St. Clair to follow up.

7. Treasurer's Report

M. Hart is preparing a financial statement to the end of July 1983, to be available shortly.

8. Southern Hemisphere Limnology

SIL is to consider in July 1983 whether to sponsor a symposium on Southern Hemisphere Limnology to be held in South Africa. B. Hart has been requested by the organisers to give ASL support to this conference, if SIL gives sponsorship. A note to this effect is to put in the newsletter and members asked to give their opinion on ASL support to B. Hart.

9. Jolly Award

A notice calling for nominations for the 1983 Jolly Award will go in the next newsletter. The decision of the Jolly Award committee on the 1983 award should be in the October or December newsletter.

10. D. Mitchell gives B. Hart a copy of his Presidential Address. It was decided to include it in the newsletter.

11. Membership forms

B. Hart and M. Hart to arrange production of 1000 updated membership application forms. $200 was allowed for this.

B. Hart suggested a general information brochure on limnology and ASL be produced for politicians, schools, etc. A. Morison to look into information to be included, format of brochures and cost.

12. Directory update

It is planned to produce the next directory by December, 1983. B. Hart suggested the directory should be updated annually.

13. Life Membership policy

M. Hart to look into investment account to be used and means of administering the account.

14. Education sub-committee

This committee has lapsed. It is hoped to revive it once information brochure available if interested people can be found.
One such function of this committee could be production of a slide-tape talk on limnology for schools. B. Hart to contact Freshwater Biological Association and American Society for Limnology and Oceanography for details of any such talks.

The meeting closed at 6.24 p.m.

Jolly Award

The Jolly Award is made by the Australian Society for Limnology to a person who, in the opinion of the Society, has made an outstanding contribution to Australian Limnology. The Award commemorates Hillary Jolly, a foundation member of the Society.

Members are invited to nominate persons for the 1984 Jolly Award. Nominations, which must be seconded, should be forwarded to the Chairman of the Jolly Award Committee at the address below by April 13, 1984. Nominations, which should be accompanied by a brief supporting statement, remain valid for ten years from the nomination date.

Dr.P.S. Lake
Chairman, Jolly Award Committee
Zoology Department
Monash University
CLAYTON 3168

We hearby nominate .....
for the Jolly Award. He/she has been/not been informed of our nomination.

Proposer (in print) .....

Signature .....

Seconder (in print) .....

Signature .....

Lower Murray Studies

At the University of Adelaide Keith Walker and a number of postgraduate students are making progress with a variety of projects concerned with ecology of the lower River Murray.

JANE MOLLER (PhD) is investigating the life histories of the freshwater mussels Alathyria jacksoni and Velesunio ambiguus. As flows in the Murray are progressively brought under control of weirs, the river species Alathyria yields dominance to Velesunio, a species of typical impounded waters and floodplain environments. The distinctive life histories of the two species are revealed by studies of gonad histology and larval development, and regular sampling and transplant experiments at river and lake sites.

SHIRLEY BALLA (MSc) is concerned with the adaptive significance of shape variation in the Murray mussels. Alathyria shows a dual growth pattern, depending upon current velocity: shells from fast-flowing water are arched in such a way that the pedal gape (and hence anchorage ability) is increased, whereas shells from moderate currents retain a more-or-less linear hinge and are, as a result, more mobile. To begin to understand the apparent trade-offs between mobility and anchorage, Shirley has had to devote a large part of her time to development of methods for precise description of shape changes.

LANCE LLOYD (MSc) recently has confirmed the existence of a population of river blackfish (Gadopsis marmoratus) in the Angas-Bremer river system, tributary to Lake Alexandrina. This is the last known population of this species in the lower Murray, and an important development in Lance's ongoing investigations of the status of small native fish in the river, with special regard for the effects of the introduced mosquitofish, Gambusia. Results from a cooperative study (destined for publication) with John Tomasov have confirmed that Gambusis in Australia is represented only by G. affinis holbrooki and not, as is generally assumed, G. a. affinis.

JIM PUCKRIDGE (MSc) is concerned with the biology of the bony bream Nematalosa erebi, among the most important of comercial fish in the lower river. The species sustains a bait fishery serving the rock lobster industry of SE South Australia, and has been used in pet food, but the common name accounts for its lack of attraction for human consumers. Despite the extaordinary abundance of bony bream, and its direct affinity with the well-known gizard shads of North America, the biology of the species in Australia is little

known. Jim's work now is focussed upon reproductive biology and population dynamics, and will later progress to questions concerned with diet and the curious recurrent infestations by the fungus Saprolegnia.

BRYAN PIERCE (PhD) has a strong background in fisheries science from Colorado State University (and earlier the University of Washington). A recent arrival, Bryan is likely to tackle a variety of questions concerned with the population dynamics and biology of carp (Cyprinus carpio). His interest in carp will be less with the peculiar attributes of that species than with questions of more general significance for freshwater fisheries management. He also will develop a series of incidental studies of some of the larger native fish species. One of these will be to investigate the potential value of hydroacoustic methods or estimation of fish stocks in the Murray.

TONY WOOLFORD (Hons) is planning an exploratory survey of the Marne River. The Marne is the sole tributary to the River Murray (proper) below the Darling, and has considerable interest as an example of an intermittent stream. The project is deliberately aimed at an exploration of the significance of the Marne for conservation and scientific purposes, and one of its goals will be to formulate recommendations for further study.

BRENDAN ATKINS (Hons) is not yet committed to a particular research question, but may undertake a study based upon comparative methods of age determination of carp or another species. Another project under consideration is the extent of dietary overlap between carp and native fish, including bony bream and catfish.

Keith's own work includes the development of computer-based methods for shape description (in support of the kind of problems under study by Shirley Balla). He is preparing a review of the effects of flow manipulations in arid-zone rivers (for a mid-year conference), and is committed also to editing of a book (Ecology of River Systems: Monographiae Biologicae) with Bryan Davies of the University of Capetown. The book is near completion, and includes chapters devoted to major river systems for which information is not readily available. These include the Orange-Vaal, Niger and Zaire (Africa), Murray-Darling (Australia), Parana and Uruguay (South America) and Colorado and the Mackenzie (North America). Keith also hopes to complete a book on the ecology of the Murray-Darling system next year, whilst on sabbatical. Having put this into print, he can scarcely back down now.

Thesis Abstracts

INVESTIGATION OF THE NATURAL ORGANIC COMPOUNDS IN SOME AUSTRALIAN FRESHWATER STREAMS

M.App.Sci. Thesis, Ronald Fisher, Water Studies Centre, Chisholm Institute of Technology

This thesis contains the results of a study of the natural organic matter and its association with four metals in four Australian freshwater streams; Clearwater, Redwater and Slip Creeks and the King River.

The dissolved organic matter from the four streams was separated using ultrafiltration. The ultrafiltration technique was fully tested with respect to recovery of organic carbon, molecular weight cut-off and filtration technique.

The majority of the dissolved organic matter from these four streams was 1000 to 10 000 dalton in size. The dissolved organic matter from Slip Creek had a very different molecular weight distribution from that of the other samples studied, and in particular had a much larger proportion of dissolved organic matter in fractions less than 1000 dalton.

Dissolved and particulate organic carbon concentrations in Slip Creek were low (2.0 and 2.2 mg C/l respectively) and did not show a seasonal trend. There was no obvious correlation between dissolved or particulate organic carbon and water discharge or rainfall. Slip Creek samples were collected in three different containers (glass bottles, polyethylene bottles and whirlpaks added small but significant quantities of organic carbon to the sample and therefore these containers cannot be recommended for collecting samples with low concetrations of organic matter.

The elemental composition of the dissolved organic matter from the four samples, was similar to that reported in the literature for fulvic acid.

In each of the four streams the majority of the iron was associated with the greater than 1000 dalton size fraction probably as colloidal iron oxide in association with organic matter. The size distribution pattern was different for each stream.

Using the amperometric titration technique, the copper complexing capacity of King River water was found to be low (6 ug Cu/l, pH = 6). It is therefore expected that most of the copper added to this river in mine effluent would not be complexed but would exist as the free ionic form. However, ultrafiltration experiments showed that most (75%) of the copper in the King River, downstream of pollution input, was associated with organic matter greater than 1000 dalton.

The major proportion (>75%) of the calcium and magnesium in all samples studied was in the less than 500 dalton fraction, probably in the divalent ionic form. Only in Slip

Creek was there a significant amount of the calcium and magnessium in the greater than 1000 dalton fractions.

THE LIMNOLOGY OF BACCHUS MARSH WASTEWATER TREATMENT PONDS

M.App.Sci. Thesis, Peter Breen, Water Studies Centre, Chisholm Institute of Technology

A study was undertaken to investigate the general seasonal behaviour of wastewater treatment ponds, and in particular the major factors influencing the occurrence of phytoplankton.

Temperature, substrate composition and zooplankton grazing were found to be the major factors influencing phytoplankton in the Bacchus Marsh wastewater treatment ponds. The influence of temperature and substrate compostion on phytoplankton behavour was related and varied both spatially and temporally within the pond system. Temperature influenced algae directly and indirectly by influencing bacterial activity, which in turn effects substrate compostion. Substrate composition was found to be the most significant factor controlling phytoplankton in the primary pond, whereas in the final ponds temperature was considered more important. In between these points in the system major influences are complex and phytoplankton are influenced by a sliding interface (temperature/substrate composition) of factors. The position of this interface within the pond system is seasonally variable. In cooler months the influence of substrate composition extends further through the pond system whereas with increasing temperatures it is restricted to the primary pond. Influence of zooplankton numbers and size distributions may be significantly effected.

The annual performance of the Bacchus Marsh wastewater treatment ponds was satisfactory with respect to BOD reductions. However, nutrient reductions were found to be extremely seasonal. Except during zooplankton blooms algal cells in the effluent would frequently cause problems with respect to suspended solids discharge limits.

Design and management recommendations are presented and possible design and operational techniques are suggested that would take into consideration the seasonal activities of most biological processes occuring in whatever treatment pond systems.

Letters

Senator P. Walsh,
Minister for Resources and Energy,
Parliament House,
Canberra.

22 Netherby Ave
Mulgrave, 3170.
3 October, 1983

Dear Senator Walsh,

The Australian Society for Limnology is deeply concerned that all Federal financial support for water research has been frozen since the start of 1983. Recently, our members were informed that the previous governments initiative to allocate $300 000 in research funds for 1983 will not be considered until after the Interim Council to investigate the establishment of an institute for freshwater research has reported.

The withholding of these research funds will be extremely damaging for the water research effort in Australia, a country which more than others needs a highly effective and continuous research program. In particular this lack of funds will seriously interupt the momentum in water research that was stimulated by the AWRC water research program and given additional impetus by the new National Water Research Council. The effect will be most noticeable in the Australian CAE's and Universities that train the research scientists and engineers who will put into effect water research in the future. Without funds these groups will not be able to maintain essential research programs and this will lead to less post graduates being trained and a loss of highly trained research staff who will become disillusioned and leave. Also we are concerned that the lack of funds has severely restricted the work opportunities of many of our younger, highly trained and motivated limnologists, at a time when there is arguably more need than ever for water research to be carried out.

ASL is also concerned that you and your advisors appear to believe that all that is needed to solve Australia's water problems is to establish a freshwater research institute. This we would argue strongly against. Even if a freshwater institute is established, it would not be possible (or even desirable) that all water research be carried out by that body. Australia is geographically too diverse for one institute, even one with a number of satellite centres in different parts of the country, to be able to research all the problems.

We would strongly urge you:

(i) to immediately reactivate the National Water Research Council, at the very least in an interim capacity;

(ii) to immediately allocate the $300 000 in research funds that were about to be issued when you came into office;

(iii) to establish a research fund of at least $1 million for 1984/85 and authorise the NWRC or AWRC to call for applications;

(iv) to consider as an urgent priority the introduction of the initiatives recommended by the AWRC inquiry "Water Research 1982".

If you feel you would like to discuss in more detail any of the above concerns, I could visit you in Canberra.

Yours sincerely,

Dr Barry T Hart,
President.

Dear Dr Hart

WATER RESEARCH

I refer to your letter of 3 October 1983 concerning Commonwealth financial support for water research.

I note your concern that the momentum in water research may be impaired and research programs disrupted by the withholding of Commonwealth funds for this purpose. While sharing your concern, the Government is also conscious of the need to ensure that research funds are allocated efficiently and that its research programs complement broad water policy and water research policy objectives.

While maintaining the provision of funds this year fo on-going research projects under the AWRC research program, the Government is presently formulating its future water policy in the light of the recently-completed Water 2000 report. Specifically in relation to water research policy, the Government considers that the report of the Interim Council established recently to enquire into the proposal for an Institute of Freshwater Studies, will form an important element in its new policy on water research.

In no sense is it envisaged that such an Institute - if established - would encompass all water research topics, but the Government believes that freshwater research has not been adequately catered for to date and is an area of sufficient importance to warrant general attention in formulating its new policy. The prime concern now is for the development of coherent policies to ensure the efficient use of scarce water resource funds and adequate coverage of generally agreed priorities.

Yours Sincerely
Peter Walsh.

Coming Events

15-17 April 1984.

Eighth Symposium on Aquatic Toxicology

Venue : Fort Mitchell, Kentucky , USA.

Details : ASTM , 1916 Race Street, Philadelphia, PA 19103 , USA.

14 to 18 May 1984

54th ANZAAS Congress

Venue : Canberra

Details : ANZAAS , PO Box 873 , Sydney 2000.

18 to 21 May 1984

ASL Annual Congress

Venue : Mt Gambier, Sth Australia.

Details : Mrs M. Hart , 22 Netherby Ave , Mulgrave 3170.

10 to 12 June 1984

Water Quality Evolution Within the Hydrological Cycle of Watersheds.

Venue : Quebec, Canada.

Details : H. Whiteley , CHS:84 Program Chairman, School of Engineering, University of Guelph , Guelph , Ontario N1G 2W1 , Canada.

2 to 6 July 1984

Municipal Wastewater Treatment Course

Venue : University of NSW

Details : Professional Education Office, School of Civil Engineering, UNSW , PO Box 1 , Kensington 2033.

3 to 13 July 1984

Perspectives in Southern Hemisphere Limnology

Venue : Wilderness, South Africa.

Details : Ecosystem Programmes, CSP, CSIRO, PO Box 395, Pretoria 0001, South Africa.

13 to 17 August 1984

Fourth International Conference on Mediterranean Ecosystems.

Venue : University of Western Australia

Theme : Resilience in Mediterranean Ecosystems

Details : MEDECOS , Botany Dept , University of Western Australia, Nedlands, W.A. 6009.

13 to 17 August 1984

Second International Conference on Copepoda

Venue : Ottawa, Canada

Details : The Secretariat, International Conference on Copepoda, University of Ottawa, 648 King Edward Avenue, Ottawa, Ontario, Canada K1N 6N5.

17 to 20 August 1984

11th Annual Congress, Australian Society for Fish Biology.

Venue : Glenelg, South Australia.

Details : S. Montgomery, Division of Fisheries, P.O. Box K220, Haymarket NSW, 2000.

20 to 26 August 1984

17th International Congress of Entomology

Venue : Hamburg, Germany

Details : Dr T. Tischler, Zoologisches Institut, Universitat Kiel, Olshausenstr. 40/60 D-2300 Kiel 1 , Federal Republic of Germany.

23 to 24 August 1984

The Ecology of Biological Invasions

Venue : Canberra

Details : Australian Academy of Sciences

28 to 29 August 1984

Ecological Society of Australia Meeting

Venue : Sydney

Theme : Are Australian Ecosystems Different ?

Details : Dr M. Westoby, Biology Dept , Macquarie University, North Ryde, NSW 2113.

? August 1984

Conservation and Management of World Lake Environment

Venue : Shiga, Japan.

Details : Dr. Tatuo Kira, Chairman of the Executive Committee, c/- Shiga Prefectural Government, 4-1-1 Kyomachi, Otsu, Shiga 520, Japan.

8 to 14 February 1987.

XXIII Congress of the International Association of Theoretical and Applied Limnology (S.I.L.)

Venue : Hamilton, New Zealand.

Details : Theme : Water, to use and enjoy. Further information will become available through Tyler.

INTERESTING QUOTES

From Macan & Worthington : Life in Lakes and Rivers. New Naturalist Series 1974.

" Powdered derris (5% rotenone) is applied at the rate of about 15lb to the acre (15kg./ha.), and a few sticks of dynamite are often thrown in to ensure thorough mixing. The effect wears of quite soon ....."

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